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Some numerical and theory issues with 2-phase mechanical equilibrium reactive burn models JAMES QUIRK, MARK SHORT, Los Alamos National Laboratory — The most widely used two-phase mixture reactive flow models for condensed phase explosive ignition and detonation modeling can be cast as reductions of a full two-phase mixture system, with various equilibrium and other assumptions (Kapila et al., Physics of Fluids, 2001). The Ignition and Growth (I&G) model, for example, assumes mechanical (pressure and velocity) phase equilibrium with an additional assumption of temperature equilibrium. The CREST model, on the other hand, fixes the post-shock entropy of the solid reactant in lieu of temperature equilibrium. The reduction to a mechanical equilibrium model from the full 2-phase system introduces a number of potential thermodynamic, conservation and numerical difficulties. Some of these issues are explored in the context of a 2-phase Stiffened Gas model for which some analytical results are available.

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